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IS 344 (1976): Varnish, stoving [CHD 20: Paints, Varnishes and Related Products]



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***Indian Standard***  
**SPECIFICATION FOR VARNISH, STOVING**  
**( *First Revision* )**

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**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# *Indian Standard*

## SPECIFICATION FOR VARNISH, STOVING

### ( *First Revision* )

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# ***Indian Standard***

## **SPECIFICATION FOR VARNISH, STOVING**

### **( *First Revision* )**

#### **0. FOREWORD**

**0.1** This Indian Standard ( First Revision ) was adopted by the Indian Standards Institution on 30 September 1976, after the draft finalized by the Paints and Allied Products Sectional Committee had been approved by the Chemical Division Council.

**0.2** This standard was first published in 1952 and was based largely on the interim co-ordinated draft prepared by the Standing Committee on Specifications for Paints and Allied Stores of the General Headquarters, India ( now Army Headquarters ).

**0.3** This revision is based on the recommendations of an *ad hoc* panel specially set up for review of the published Indian Standards on paints and allied products. In this revision, requirement for acid value has been reduced; requirement for flash point has been reduced to allow use of stronger solvents; drying schedule ( stoving temperature and period ) has been modified in accordance with the latest practice in the field; and requirement for colour of the material has been suitably modified.

**0.4** This standard contains items (i), (iii) and (ix) of Table 1 and clause 5.1 which call for agreement between the purchaser and the supplier.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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#### **1. SCOPE**

**1.1** This standard prescribes requirements and methods of sampling and test for the material commercially known as varnish, stoving, used for the protection and decoration of metal surfaces.

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\*Rules for rounding off numerical values ( *revised* ).

## 2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 6667-1972\* and under 2 of IS : 197-1969† shall apply.

## 3. TYPES

3.1 The material shall be of the following two types :

- a) Clear, and
- b) Tinted.

## 4. REQUIREMENTS

4.1 **Description** — The material shall be clear and transparent, or tinted, as required, and shall be free from foreign matter, sediment and undissolved water.

4.2 **Composition** — The material shall be based on resins, drying oils, driers and thinners, together with soluble colouring matter, when required, in suitable proportions to satisfy the requirements of this standard.

4.3 **Resistance to Petroleum Hydrocarbon Solvent** — The film of the material shall show no sign of permanent injury or removal, when tested as prescribed in Appendix A.

4.4 **Resistance to Lubricating Oil** — The film of the material shall show no sign of permanent injury or removal, when tested as prescribed in Appendix B.

4.5 **Resistance to Water** — The film of the material shall show no sign of softening, blistering, cracking, more than slight dulling or change of colour, or any other sign of failure, when tested as prescribed in Appendix C.

4.6 The material shall also comply with the requirements given in Table 1.

## 5. PACKING AND MARKING

5.1 **Packing** — The material shall be packed in tin or galvanized containers, or as agreed to between the purchaser and the supplier.

NOTE — The material, when intended for defence purposes, shall be packed and marked in accordance with IS : 5661-1970‡.

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\*Glossary of terms used in synthetic resin industry.

†Methods of sampling and test for varnishes and lacquers (*first revision*).

‡Code of practice for packing and marking of packages of paints, enamels, varnishes, and allied products.



TABLE 1 REQUIREMENTS FOR VARNISH, STOVING

( Clause 4.6 )

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST ( REF TO CL No. IN IS : 197-1969* )
(1)	(2)	(3)	(4)
i)	Drying time†, hard dry	Not more than 45 minutes at 120°C or as agreed to between the purchaser and the supplier	7
ii)	Finish†	Smooth and glossy	8
iii)	Colour†	Close match to the approved sample or as agreed to between the purchaser and the supplier	9
iv)	Scratch hardness†	No such scratch as to show the bare metal	10
v)	Flexibility and adhesion†	No visible damage or detachment of film	11 ( Method 1 )
vi)	Stripping test†	Scratches free from jagged edges	12
vii)	Flash point, <i>Min</i>	21°C	13
vjii)	Volatile matter content, percent by mass, <i>Max</i>	60.0	15
ix)	Viscosity at 30°C	As agreed to between the purchaser and the supplier	17
x)	Acid value, <i>Max</i>	15.0	18
xi)	Keeping properties	Not less than one year from the date of manufacture	20

\*Methods of sampling and test for varnishes and lacquers (*first revision* ).†The test shall be carried out on stoved film ( *see 7.1.1* ).

**5.2 Marking** — Each container shall be marked with the following particulars :

- Name and type of the material;
- Name of the manufacturer or his recognized trade-mark, if any;
- Volume of the material;
- Batch No. or lot No. in code or otherwise; and
- Month and year of manufacture.

**5.2.1** The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements, of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

**5.3** Other details of packing and marking shall be in accordance with the instructions given by the purchaser.

**6. SAMPLING**

**6.1** Representative samples of the material shall be prepared as prescribed under 3 of IS : 197-1969\*.

**7. TEST METHODS**

**7.1** Tests shall be conducted as prescribed in IS : 197-1969\* and Appendices A to C. Reference to the relevant clauses of IS : 197-1969\* is given in col 4 of Table 1.

**7.1.1** Tests marked with obelisk (†) in Table 1 shall be carried out on stoved film. Stoving shall be carried out for 45 minutes at 120°C or as agreed to between the purchaser and the supplier.

**7.2 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water ( *see* IS : 1070-1960† ) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which, affect the results of analysis.

**8. CRITERIA FOR CONFORMITY**

**8.1** A lot shall be declared as conforming to the requirements of this standard if the test results on the composite sample satisfy the requirements prescribed under 4.

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\*Methods of sampling and test for varnishes and lacquers (*first revision*).

†Specification for water, distilled quality (*revised*).

**APPENDIX A**( *Clause 4.3* )**TEST FOR RESISTANCE TO PETROLEUM  
HYDROCARBON SOLVENT**

**A-1.** Apply a coat of the material by brushing to a  $150 \times 50 \times 0.32$  mm tinned plate panel to give a dry film mass of 17 to 25 g/m<sup>2</sup>. Stove the panel under conditions specified in 7.1.1, and in 7.3.2 of IS : 197-1969\*. Allow to cool to room temperature, immerse in petroleum hydrocarbon solvent ( *see* IS : 1745-1966† ) for 1 minute, remove and allow to stand in vertical position for 5 minutes at room temperature. Swab vigorously for 5 seconds with cotton-wool swab soaked in petroleum hydrocarbon solvent.

**A-2.** The film shall show no sign of permanent injury or removal.

**APPENDIX B**( *Clause 4.4* )**TEST FOR RESISTANCE TO LUBRICATING OIL**

**B-1.** Prepare a  $150 \times 50 \times 0.32$  mm panel as prescribed in **A-1**. Allow to cool to room temperature and immerse for 2 hours at a temperature of 50°C in mineral lubricating oil ( *see* IS : 493-1958‡ ) having a time of flow, for 50 ml, of approximately 80 seconds at 60°C in a No. 1 Redwood viscometer. Wipe the film free from the lubricating oil.

**B-2.** The film shall show no sign of permanent injury or removal.

**APPENDIX C**( *Clause 4.5* )**TEST FOR RESISTANCE TO WATER**

**C-1.** Prepare a glass panel as prescribed under **A-1**. Allow to cool to room temperature and immerse in distilled water for 24 hours. Examine the panel 4 hours after removal from the water.

**C-2.** The film shall show no sign of softening, blistering, cracking, more than slight dulling or change of colour, or any other sign of failure.

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\*Methods of sampling test for varnishes and lacquers ( *first revision* ).

†Specification for petroleum hydrocarbon solvents ( *first revision* ).

‡Specification for machinery and spindle oils.

# INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

## Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Conversion</i>
Force	newton	N	1 N = 1 kg. 1 m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

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